

REMARKS REGARDING THE FINAL OFFICE ACTION

The Final Office Action mailed July 25, 2005 has been received and reviewed. Claims 24 through 31 are currently pending in the application. Claims 24 through 31 stand rejected. Applicant proposes to cancel claim 27 and proposes to amend claims 24, 26, and 28-31. Reconsideration of the application as proposed to be amended herein is respectfully requested.

Claim Objections

Claims 24, 28, 29, 30 and 31 are objected to due to informalities in the claim language. Appropriate correction has been made.

35 U.S.C. § 112 Claim Rejections

Claim 27 stands rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 27 has been canceled.

35 U.S.C. § 102 Anticipation Rejections

Anticipation Rejection Based on U.S. Patent No. 6,040,524 to Kobayashi et al.

Claims 24, 26, 28 and 30 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Kobayashi et al. (U.S. Patent No. 6,040,524). Applicant respectfully traverses this rejection, as hereinafter set forth.

Anticipation Rejection Based on U.S. Patent No. 3,398,232 to Hoffman

Claims 24, 27, 28, 29 and 30 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Hoffman (U.S. Patent No. 3,398,232). Applicant respectfully traverses this rejection, as hereinafter set forth.

Anticipation Rejection Based on U.S. Patent No. 4,130,723 to Wakeling

Claims 24, 26, 27, 28, 29 and 30 stand rejected under 35 U.S.C. § 102(b) as being

anticipated by Wakeling (U.S. Patent No. 4,130,723). Applicant respectfully traverses this rejection, as hereinafter set forth.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Regarding claim 24, this claim stands rejected as being anticipated by Kobayashi et al., Hoffman, and Wakeling. Applicant proposes to amend claim 24 to modify a “substrate” to a “semiconductor substrate.” In addition, Applicant proposes to amend claim 24 to include “a plurality of solder balls disposed on the at least one side of the semiconductor substrate, wherein at least one of the plurality of solder balls is operably coupled to at least one of the plurality of signal traces and at least one of the plurality of solder balls is operably coupled to the voltage reference signal.”

With these proposed amendments, Applicant asserts that claim 24 is no longer anticipated by Kobayashi et al., Hoffman, or Wakeling. Applicants can find no reference to “an electrically conductive layer disposed on at least one side of the **semiconductor substrate**,” as recited in the proposed amendment to claim 24. It appears to Applicant that Kobayashi et al., Hoffman, and Wakeling are directed to printed circuit board substrates and do not disclose a conductive layer disposed on a semiconductor substrate. In addition, Applicant can find no disclosure of solder balls operably coupled to the signal traces or the voltage reference signal as recited in the proposed amendment to claim 24.

As a result of these proposed amendments, each and every element of claim 24 are not set forth, either expressly or inherently, in the cited references of Kobayashi et al., Hoffman, and Wakeling, as required for a 35 U.S.C. § 102 rejection. Therefore, Applicant respectfully requests that the amendments be entered and the rejection of claim 24 be withdrawn.

Regarding claim 26, this claim stands rejected as being anticipated by Kobayashi et al. and Wakeling. Claim 26 depends from claim 24. Therefore, at least by virtue of its dependency from amended claim 24, claim 26 is allowable. As a result, Applicant respectfully requests that the amendments to claims 24 and 26 be entered, and the rejection of claim 26 be withdrawn.

Regarding claim 27, this claim is canceled.

Regarding claim 28, this claim stands rejected as being anticipated by Kobayashi et al., Hoffman, and Wakeling. Claim 28 depends from claim 24. Therefore, at least by virtue of its dependency from amended claim 24, claim 28 is allowable. As a result, Applicant respectfully requests that the amendments to claims 24 and 28 be entered, and the rejection of claim 28 be withdrawn.

Regarding claim 29, this claim stands rejected as being anticipated by Hoffman and Wakeling. Claim 29 depends from claim 28, which depends from claim 24. Therefore, at least by virtue of its dependency from amended claim 24 and amended claim 28, claim 29 is allowable. As a result, Applicant respectfully requests that the amendments to claims 24, 28, and 29 be entered, and the rejection of claim 29 be withdrawn.

Regarding claim 30, this claim stands rejected as being anticipated by Kobayashi et al., Hoffman, and Wakeling. Claim 30 depends from claim 28, which depends from claim 24. Therefore, at least by virtue of its dependency from amended claim 24 and amended claim 28, claim 30 is allowable. As a result, Applicant respectfully requests that the amendments to claims 24, 28, and 30 be entered and the rejection of claim 30 be withdrawn.

35 U.S.C. § 103(a) Obviousness Rejections

Obviousness Rejection Based on U.S. Patent No. 6,373,740 to Forbes et al. in view of either U.S. Patent No. 6,040,524 to Kobayashi et al. or U.S. Patent No. 4,130,723 to Wakeling

Claim 31 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Forbes et al. (U.S. Patent No. 6,373,740) in view of either Kobayashi et al. (U.S. Patent No. 6,040,524) or Wakeling (U.S. Patent No. 4,130,723). Applicant respectfully traverses this rejection, as hereinafter set forth.

M.P.E.P. 706.02(j) sets forth the standard for a Section 103(a) rejection:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, **the prior art reference (or references when combined) must teach or suggest all the claim limitations.** The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). (Emphasis added).

Regarding claim 31, Applicant proposes to amend claim 31 with amendments similar to those of claim 24. Specifically, Applicant proposes to amend claim 31 to modify a "substrate" to a "semiconductor substrate." In addition, Applicant proposes to amend claim 31 to include "a plurality of solder balls disposed on the at least one side of the semiconductor substrate, wherein at least one of the plurality of solder balls is operably coupled to at least one of the plurality of signal traces and at least one of the plurality of solder balls is operably coupled to the voltage reference signal." With these amendments, Applicant asserts that the combinations of Forbes et al. with Kobayashi et al. or Forbes et al with Wakeling do not teach or suggest all the claim limitations of amended claim 31, as is required for a proper 35 U.S.C. § 103 rejection. Namely, Applicants can find no teaching or suggestion of "a plurality of solder balls disposed on the at least one side of the semiconductor substrate" in the cited prior art references. Therefore, Applicant respectfully requests that the amendments to claim 31 be entered and the rejection of claim 31 be withdrawn.

Obviousness Rejection Based on U.S. Patent No. 6,040,524 to Kobayashi et al., U.S. Patent No. 3,398,232 to Hoffman, or U.S. Patent No. 4,130,723 to Wakeling in view of U.S. Patent No. 6,631,446 to Quan

Claim 25 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Kobayashi et al. (U.S. Patent No. 6,040,524), Hoffman (U.S. Patent No. 3,398,232), or Wakeling (U.S. Patent No. 4,130,723) in view of Quan (U.S. Patent No. 6,631,446). Applicant respectfully traverses this rejection, as hereinafter set forth.

Regarding claim 25, this claim depends from claim 24. Therefore, at least by virtue of its dependency from amended claim 24, claim 25 is allowable. As a result, Applicant respectfully requests that the amendments to claim 24 be entered and the rejection of claim 25 be withdrawn.

REMARKS REGARDING THE ADVISORY ACTION

The Advisory Action mailed October 12, 2005, have been received and reviewed. Claims 24 through 31 are currently pending in the application. Claims 24 through 31 stand rejected. Applicants request that the amendments outlined above be entered and respectfully requests reconsideration of the application as amended herein.

The advisory action states in item 3(d) that, "regarding 3(a), the added limitation that the solder balls coupled to the signal trace and the voltage reference (claims 24, 31) does not appear supported by the original disclosure."

The specification, at paragraph 0022 indicates that, "[f]igure 11 is a diagram illustrating a flip-chip semiconductor die having circuit traces thereon configured according to an embodiment of the present invention."

In addition, at paragraph 0036 the specification states that, "[a]s shown in Figure 15, circuit traces 118 may be fabricated on the surface of a semiconductor wafer 116 of silicon, gallium arsenide, or indium phosphide in accordance with one or more embodiments of the present invention. One of ordinary skill in the art will understand how to adapt such designs for a specific chip architecture or semiconductor fabrication process."

Finally, at paragraph 0036 the specification states that, "Figure 11 illustrates an embodiment of the present invention wherein circuit traces 24 are placed on the surface of a semiconductor substrate 26, more particularly, in a flip-chip ball grid array ("BGA") application. Like previous embodiments, the circuit traces 24 are configured such that a voltage reference trace is placed between each of two signal traces so that no signal trace is placed immediately adjacent another signal trace" (paragraph 0032).

The solder balls and "circuit traces" are clearly shown in FIG. 11. Furthermore, paragraph 0027 of the specification states that "[a]s used herein, the term "circuit trace" refers not only to a surface conductive path which is conventionally formed upon the surface of a printed circuit board, but to any conductive path formed on, in or through a substrate such as a printed circuit board, thin film device or other semiconductor device. The circuit traces 14 of the present invention are primarily of two kinds, signal traces 16 and voltage reference traces 18."

While not explicitly stated in the specification that the circuit traces are operably coupled

to the solder balls, it would be implicit to those of ordinary skill in the art that the balls in the BGA are operably coupled to signal traces and voltage references on the semiconductor substrate so that voltage references and signals may be communicated to and from the semiconductor substrate. Therefore, Applicants assert that the element recited in claims 24 and 31 of “a plurality of solder balls disposed on the at least one side of the semiconductor substrate, wherein at least one of the plurality of solder balls is operably coupled to at least one of the plurality of signal traces and at least one of the plurality of solder balls is operably coupled to the voltage reference signal,” is found within the specification and drawings.

ENTRY OF AMENDMENTS

Applicant respectfully requests that the proposed cancellation of claim 27 and the proposed amendments to claims 24, 26, and 28-31, be entered by the Examiner because the amendments are supported by the as-filed specification and drawings and do not add any new matter to the application. If the Examiner determines that the amendments do not place the application in condition for allowance, entry is respectfully requested upon filing of a Notice of Appeal herein.

CONCLUSION

Claims 24-26 and 28-31 are believed to be in condition for allowance, and an early notice thereof is respectfully solicited. Should the Examiner determine that additional issues remain which might be resolved by a telephone conference, he is respectfully invited to contact Applicant's undersigned attorney.

Respectfully submitted,



Jeff M. Michelsen
Registration No. 50,978
Attorney for Applicant
TRASKBRITT
P.O. Box 2550
Salt Lake City, Utah 84110-2550
Telephone: 801-532-1922

Date: October 25, 2005
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